

REMARKS

Review and reconsideration of the Office Action dated May 31, 2005, is respectfully requested in view of the above amendments and the following remarks.

Status of Claims

The present continuation application as filed defined the invention both in terms of product and process. Applicants presented different arguments in support of each type of claim.

In the Office Action of May 31, 2005 the Examiner indicated that he did not find the product claims to distinguish over the encapsulated flavouring preparations and/or perfume preparations that can be produced by the prior art.

It did not appear to Applicants that the Examiner had fully considered and/or addressed the arguments presented with regard to the process claims.

Accordingly, to expedite examination of process claims and to secure issuance of a patent directed to the process claims, Applicants herewith cancel product claims 1, 3, 4 and 11-20, so that the Examiner may focus on and advance to allowance the process claims 2, 5-10 and 21-24.

The product (flavor particle) claims are canceled from the present application in view of the complexity of the batch and continuous particle producing processes. Applicants were not able to dedicate laboratory facilities and manhours to conducting comparative experimentation to compare the inventive particles with the prior art particles. Applicants respectfully submit that the present application focuses on process claims, that a surprising number of significant advantages are directly attributable the selection of the present continuous process

with limiting of residency time to less than 20 minutes, and thus the process claims should be allowable without any need to conduct expensive and time consuming experimentation.

Office Action

Turning now to the Office Action, the paragraphing of the Examiner is adopted.

Claim Rejections - 35 U.S.C. § 102 and § 103

Claims 1, 2, 5-10, 12-17, and 21-24 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Johnson (US Patent No. 4,576,737) and Cherukuri et al (US Patent No. 5,004,595).

Basically, Johnson is cited for encapsulating in a fluidized bed agglomerator and Cherukuri et al is cited for teaching encapsulating in a fluidized bed type process. The Examiner takes the position that "since the same components and equipment are utilized" the modification of residence time and height would be obvious.

Applicants respectfully traverse.

Claim 21 in particular, focusing on the inventive reduced "residency time" of the flavoring and/or perfume preparation in the fluidized bed and the thereby increased retention of volatile flavoring and/or perfume ingredients, i.e., maintaining substantially the same proportions in the granules as in the spray solution, succinctly defines the invention.

Briefly reviewing, the present inventor recognized that there was a recurring problem associated with the state of the art fluidized bed processes for encapsulating flavoring or

perfume compositions, namely, during this process not only is **solvent** removed by the fluidizing gas, but also about 10-15% of the **volatile flavor or fragrance components** are removed and lost. Thus, while known process produce encapsulated flavor or perfume particles with good spherical shape and good particle size distribution, they suffer from a problem: if a desired final flavor or perfume formulation is sprayed into the fluidizing gas, VOC (not only solvent, but also volatile flavor or perfume ingredient) is lost during the spray agglomeration process, and the flavor or fragrance of the final particle product is different from the starting formulation.

The references cited by the Examiner merely exemplify the state of the art. Applicants have closely read Johnson (USP 4,567,737), the main reference relied upon by the Examiner. According to the teachings of Johnson, an emulsion of volatile liquid and suitable carrier material and water is sprayed into a fluidized bed agglomerator, **which has previously been charged with a small quantity of a particulate carrier material** or, preferably, with a sample of small encapsulates containing the volatile liquid to be employed in the bulk preparation. Thus, granulation nuclei are not formed in the fluidized bed, as required in present claim 1.

It is noted that at (col. 3, line 15) there is disclosure that it is desirable to run the process as a **continuous** one to ensure maximum uniformity of product. However, Johnson also teaches that the residence time is variable, that spraying of emulsion may be continued until desired particle size has been reached, **There is no teaching of sifting out "mature" particles and introducing new nuclei.** So what would the person of ordinary skill in the art understand to be meant here by

"continuous"? Evidently, small batches are to be continuously made consecutively. This "continuously repeated batch process" is not the same as the continuous process recited in claim 21.

In Example 1 (and thus also Examples 3-5) 400g Capsul, 600g water and 250g perfume (=1250g) are pumped into the fluidized bed at a flow rate of between 10/20 g min., then fluidization was continued for 2-3 minutes, and finally **all the product was discharged from the agglomeration chamber**. The procedure thus took anywhere from 65 -125 minutes (depending upon flow rate). Since the material was continuously sprayed in, the mean **residence time** (total/2) would be **32-62 minutes**. **Thus, closest prior art would be 32 minute mean residence time.**

Johnson Example 2, the alternative example, begins with 10Kg emulsion, adds at 2.5 to 5 Kg/hr, so estimate 2-3 hrs, mean time = 1-1.5 hrs. In view of large mass and long time, Example 2 is not as close as Example 1.

Accordingly, Johnson is not relevant in that

- the Examples are limited to a **batch process** (the specification teaches that all "product is discharged"),
- the products produced in the batch process, when compared to the original formulation, are "**acceptably similar**" or "**compared satisfactorily**" - the person of ordinary skill in this art, reading this, having experience with this technique, would understand that some components of the original fragrance or flavor components were lost, otherwise the evaluation would have read "identical to original",

- there is merely mention that "Since the residence time in the fluidized bed is controllable, the spraying of the emulsion may be continued until the required particle size of encapsulate has been obtained".
"Furthermore, since the **residence time is not critical**, the equipment used for spraying in the emulsion onto the bed may be chosen to cover a wider range of viscosity and flow characteristics than is normally available in a spray-drying tower." (col. 3, line 21) This teaches that (a) residence time does not influence final product, and (b) that the same results can be obtained at any desired residence time.

Accordingly, this reference teaching that residency time in a batch process is not critical, and that the disclosed "best mode" of the process is capable of producing only "acceptable" product, is not relevant to the present product by process claims by which a superior product is obtained without waste.

Applicants further advise that the way known in the art to address this "lost VOC" problem is to "front end load" the sprayed in formulation with a disproportionately high amount of the volatile component, based on a prediction of the amount that will be lost. However, since this VOC component may be expensive and is lost, this increases the cost of the process. Further, VOC are considered pollutants and have to be captured, adding equipment cost. Further, it is difficult to predict precisely how much supplemental volatile chemical must be added up front in order to arrive at the desired final balanced formulation since -

- (1) the vapor pressure of some VOC's may change the evaporation rate of other VOCs, affecting the final balance,
- (2) the evaporation or entrainment rates vary with process parameters such as temperature, gas, etc, thus for each set of process parameters a different starting mixture must be formulated, and the process parameters must be strictly controlled to avoid off-flavor final product, and
- (3) a perfume or flavor has many ingredients, and it is the final balance that determines fragrance or taste, thus a slight change in balance can render a final granules off-target and useless.

Accordingly, the known way to attempt to counteract the loss of VOC is wasteful and complex and does not reliably produce good product.

Applicants recognized that what is needed is a way to produce a final product which has flavor or perfume characteristics comparable to the starting material, thus eliminating the need for back-engineering a different starting formula for each set of process parameters.

What is also needed is a way to produce a final product in which the process parameters can be easily controlled, such that it becomes easy to produce a high quality final product.

In accordance with the present invention as claimed in claim 21, this is done simply by limiting the residency of the particles in the fluidized bed. By limiting residency time, high evaporation rates of flavorant/aroma is avoided and the

final product has an unexpectedly superior trueness to the original flavor/fragrance.

Turning to Cherukuri et al, the second main reference cited by the Examiner, Applicants have reviewed this reference and have determined that it is not relevant to the present invention. Particles are simply produced by spray drying or, if in a fluidized bed, in a batch process.

Present claim 21 includes as the main "critical claim limitation" a residency time of the flavoring and/or perfume preparation in the fluidized bed of less than 20 minutes. The closest prior art does not teach this critical limitation. As disclosed in the specification, the final product has same flavor or perfume characteristic as starting formulation. Claim 21 accordingly recites that the final product has essentially the same proportions of flavor or fragrance ingredients as the sprayed-in starting composition.

The person of ordinary skill in the art would not have been able to predict the significant number of improvements directly attributable to the inventive process.

For example, in the aroma profile of a product using a strawberry formulation, 10-15% more material is present in the final product (meaning it is not lost along with the evaporated solvent) when using the inventive process (WSG) compared to GPCG 3. This 15% represents a vast shift in flavor between starting (sprayed in) formulation and composition of final particle product.

Accordingly, the prior art not teaching the critical limitation of the present claims 1 or 21, withdrawal of the rejection is respectfully requested.

The person of ordinary skill, reading the prior art, would

have found the following problems inherent in the prior art process:

First, the long residency time resulted in heat stress of the granules as well as high losses of volatile flavorings - unavoidable consequences of evaporating the high content of solvents.

Second, the particle size distribution produced in accordance with the prior art process was broad since different particles nucleated at different times, requiring screening for sizing during or after completion of the batch process.

Third, the prior art process produced particles with high filler content in the core, with flavorings adsorbed only at the surface. This reduced protection of the flavorings and limited loading.

Fourth, although such particles could be coated for protection, their non-uniform particle size distribution and irregular granule surface made uniform coating (and thus particles with consistent properties) difficult.

Fifth, VOC (solvents and flavorings) are considered pollutants and have to be captured, adding equipment cost.

Further yet, flavors and fragrances are a mix of high and low volatile ingredients, and since volatile components are more readily lost during evaporation, less of the starting high volatile compounds end up in the produced particles, thus the particle composition departs from the starting formulation. In view of the unavoidable loss of volatile ingredients, it was necessary in the conventional batch process to "front end load" the starting (sprayed in) formulation with a disproportionately high amount of the volatile component, to compensate for high loss of volatiles. It is difficult to predict precisely how

much supplemental volatile chemical must be added up front in order to arrive at the desired final balanced formulation since the vapor pressure of some VOC's may change the evaporation rate of other VOCs, affecting the final balance, the evaporation or entrainment rates vary with process parameters such as temperature, gas, etc. Thus for each set of process parameters a different starting mixture must be formulated, and the process parameters must be strictly controlled to avoid off-flavor final product. Since a perfume or flavor has many ingredients, and it is the final balance that determines fragrance or taste, even a slight change in balance can render a final granules off-target and useless. This is particularly important industrially where consistency of product is extremely important.

Accordingly, as evidenced by the prior art cited by the Examiner, there has been a needed for a way to produce a final product which has flavor or perfume characteristics comparable to the starting material, thus eliminating the need for back-engineering a different starting formula for each set of process parameters.

There was also a need for a way to produce a final product in which the process parameters can be easily controlled, such that it becomes easy to produce a high quality final product.

The present inventors have discovered that if encapsulated flavoring or perfume preparations are prepared

(a) by a continuous fluidized-bed spray agglomeration process

(b) by strictly limiting the mean residence time of the flavouring preparation and/or perfume preparation sprayed in to less than 20 minutes in the fluidized bed, there are improvements over the prior art both with regard to the produced

product and with regard to the process.

The results obtained represent a significant improvement in the prior art process, not only in the obtained product, but also in regard to incidental benefits, such as reduction in VOC. The benefits which inure to the final product are directly inherent in the claimed process:

- reduction in off-flavor or burned-flavor results from reduced residency time in the hot evaporation bed (claim 21);
- the continuous classification of granules results in an output of very consistent size and quality granules (claim 21),
- the consistency of quality and flavor results from the above;
- the reduced residency time results in lower evolution of VOC, and
- due to limited loss of the volatile component of the fragrance or flavorant during particle production, the entire process is easier to set up, easier to control, and more reliably produces the targeted flavor or fragrance particles without experimentation or waste.

Thus, since residency time is kept short, the problems of wasted expensive high volatile flavoring or perfume ingredient are avoided. The advantages are directly tied to the recited process steps.

Of great significance to the person working in this art is the increase in predictability in final product resulting from the present process, resulting in less need for experimentation and less need for monitoring process parameters. Since flavors

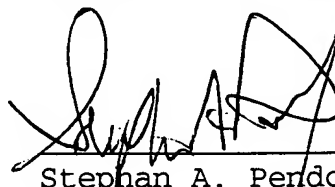
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and fragrances are a mix of high and low volatile ingredients, and since volatile components are not as readily lost during evaporation in the process according to the present invention, more of the starting high volatile compounds end up in the produced particles, thus the particle composition more faithfully represents the starting formulation, making it much easier to formulate the material to be sprayed into the fluidized bed.

Applicants believe that all the claims are now allowable. Favorable consideration and early issuance of the Notice of Allowance are respectfully requested. Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.

Respectfully submitted,



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CERTIFICATE OF MAILING AND AUTHORIZATION TO CHARGE

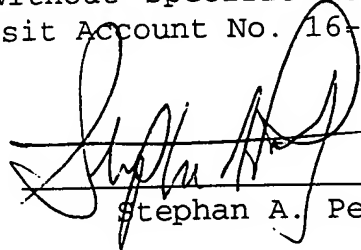
I hereby certify that the foregoing AMENDMENT A for U.S. Application No. 10/602,409 filed June 23, 2003, was deposited in first class U.S. mail, with sufficient postage, addressed: Mail Stop Amendment, Commissioner of Patents and Trademarks, P.O. Box 1450, Alexandria, VA 22313-1450, on **November 30, 2005**.

The Commissioner is hereby authorized to charge any

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additional fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account No. 16-0877.



Stephan A. Pendorf